

Almost 30 Years of Writing Research: Making Sense of It All with *The Wrath of Khan*

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In this invited article, we present an ongoing research program in the area of writing. Although this program has focused on students with learning disabilities (LD) and other struggling writers, it has also concentrated more broadly on issues involving writing development and general writing instruction. One purpose of this review was to share our basic findings in each of these areas, as they have important implications for teaching writing to students with LD. Another purpose was to illustrate how an ongoing research program develops and grows over time. To make this process more concrete, we employed several different literacy devices, including drawing an analogy between the development of our research program and the development of the story line for *Star Trek II: The Wrath of Khan*. Our final purpose was to describe the research we plan to do in the near future.

After agreeing to direct the film, *Star Trek II—The Wrath of Khan*, Harve Bennett, who had seen only a few episodes of *Star Trek* on television, spent 3 months watching every episode of the television series at least once (Shatner & Kreski, 1994) as well as the artistically and financially unsuccessful first movie, *Star Trek: The Motion Picture*. This helped him identify the main themes in *Star Trek*, including that it was a story about heroes, set in a future where human beings behaved just as they did in the 20th century.

Long-standing research programs such as ours often start in a similar way. Steve Graham's initial research (Graham, 1980) focused on the reading characteristics of students with learning disabilities (LD), whereas Karen Harris started her academic career by conducting research with children who were extremely shy (e.g., Harris & Brown, 1982). Both of us were interested in cognitive-oriented instruction: Steve through his exposure to the learning strategies instructional model as a doctoral student at the University of Kansas (Alley & Deshler, 1979) and Karen through the cognitive behavior modification work of the eminent psychologist, Don Meichenbaum (1977). Like Harve Bennett with *Star Trek*, we had only a cursory knowledge of writing research when we decided that our mutual interest in cognitive-oriented instruction might prove useful in addressing the writing problems of students with LD. We addressed this lack of knowledge as Mr. Bennett did, by immersing ourselves in the subject at hand.

During the late 1970s and early 1980s, we conducted a series of literature reviews (Graham, 1982; Graham & Miller, 1979, 1980; Harris, 1982) that covered writing research as

well as cognitive behavior modification. Each of these reviews provided a historical synthesis of the literature, summarizing developmental as well as instructional findings. This allowed us to determine what had already been done and to identify some things that still needed to be done.

A similar discovery process occurred for Harve Bennett. After watching all of the *Star Trek* productions, he realized that the first thing the new movie needed to do was “honestly and aggressively deal with the obvious, unavoidable aging of the *Enterprise* crew” (Shatner & Kreski, 1994, p. 103). In other words, what happens when heroes age? For us, we decided that the first thing we needed to do was develop an instructional model for teaching basic writing processes, such as planning, revising, and self-regulation strategies, to students with LD. Drawing on her earlier work with shy children, Meichenbaum's cognitive behavior modification approach, Alley and Deshler's (1979) learning strategies model, the theories of Luria and Vygotsky (see Harris, Santangelo, & Graham, in press), and research by Ann Brown (Brown, Campione, & Day, 1981), Karen developed an instructional model that we initially referred to as self-control strategy training (Harris & Graham, 1985), later as self-instructional strategy training (e.g., Graham, Harris, & Sawyer, 1987), and finally as self-regulated strategy development (SRS) (Harris & Graham, 1992). This model has subsequently been tested in over 40 instructional writing studies as well as in other academic areas (see Graham, 2006a; Harris, Graham, Brindle, & Sandmel, in press; Rogers & Graham, 2008).

Once Harve Bennett decided that the crew of the *Enterprise* should be allowed to gray and move forward with their lives, his next decision was to make the new *Star Trek* movie a sequel to the television episode he enjoyed most when reviewing the series. *Space Speed* was the story about

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a group of genetically engineered supermen, led by Khan. They attempted to take command of the *Enterprise*, but were eventually abandoned by Captain Kirk on a desolate planet. By linking the movie to this previous episode, Bennett provided a foundation for the new tale that included in Khan a clearly defined black-hat villain who was intent on revenge no matter what the cost.

Of course our research program was not this dramatic, but the foundation on which our SRSD model was based shaped much of our subsequent research. We developed this model on what we knew about students with LD and other struggling learners (Harris, 1982). While such students form a heterogeneous group, the difficulties they face arise from multiple problems of an affective, behavioral, and cognitive nature (Harris, Graham, & Mason, 2003). This includes difficulty with the self-regulation of organized strategic behaviors, incomplete and even inaccurate knowledge about important academic tasks such as writing, and low motivation including self-doubts, negative attitudes, maladaptive attributions, minimal effort, and low self-efficacy. As a result, SRSD was constructed on the premise that students with LD and other struggling learners would benefit from an integrated instructional approach that deliberately and directly addressed these issues. This was especially important with writing, as research in the early 1980s (Flower & Hayes, 1980) demonstrated that skilled writing was a highly demanding process that was self-directed, requiring the orchestration of a variety of cognitive processes such as planning and revising as well as types of knowledge including discourse and genre knowledge. As a result, the foundational constructs of strategic behavior, knowledge, and motivation have been central to our research on writing, including but not limited to research on SRSD.

Once Harve Bennett worked out some of the initial ideas for the new *Star Trek* movie, other ideas were proposed, abandoned, and reexamined as five drafts of a story for the movie were developed (Shatner & Kreski, 1994). At that point, Nick Meyer was asked to look at all five previous scripts. Together with Harve Bennett and Bob Sallin, the newly hired producer, Nick made a list of all the things they liked in the five versions of the story. Then, he wrote his own script, working backward “toward predetermined circumstances that could combine all of the dramatic threads Harve and Bob and I had spoken about” (p. 115). This script provided “the building block for one of the best *Star Trek* films of them all. . .” (p. 116).

While the constructs of strategies, knowledge, and motivation provided the building blocks for much of our writing research, our path and the paths of other long-term programs of research in education share some striking similarities to the construction of the story line for *Star Trek II*. Although the development of our research program was an orderly process, it was a recursive and critical one that included the constant examination of assumptions, reconceptualization of existing ideas, addition of new ideas, and working backward toward our initial building blocks.

Let’s start with working backward. When SRSD was developed, there was little known about the writing of students with LD, and what research did exist focused on students’ written products (see Poplin, Gray, Larsen, Banikowski, &

Mehring, 1980), not on how they wrote (strategic behavior), what they knew (knowledge), or what they believed (motivation). Although new research had started to concentrate on process and knowledge (see Gregg & Steinberg, 1982), much of this research was with adults rather than children. One logical progression at this point involved conducting or waiting until others conducted research that examined the factors that fueled writing development (e.g., the role of genre and discourse knowledge in learning to write) as well as investigating if these same factors played a role in the writing problems of students with LD and other struggling writers. With this scenario, we would have waited for additional data before developing an intervention. Another logical approach involved taking what we knew at that point and devising and subsequently testing the best intervention possible. We made the conscious decision to take the second path. This decision was shaped in part by our personalities, as we are both solution oriented, and our former experiences as classroom teachers; teachers want tools that work now.

The path we chose to take was not without risks. Consequently, we have conducted considerable research over the years, working backward to determine the validity of our original premises about the importance of strategic behavior, knowledge, and motivation in writing development and the writing difficulties experienced by students with LD and other struggling writers. We contend that greater trust can be placed in conclusions drawn from converging evidence from multiple sources. Moreover, diverging as well as new evidence, empirical and theoretical, can lead a research team to reexamine existing assumptions, modify their thinking, and explore other options.

To illustrate, our initial research on the effectiveness of the SRSD model focused on struggling writers in Grades 4 to 8. We concentrated on these students because SRSD is a sophisticated instructional approach, and we were concerned that it might be better suited to intermediate rather than primary-grade students. While SRSD instruction was highly effective with these older students (see Graham & Harris, 2003; Graham & Perrin, 2007a; Rogers & Graham, 2008), we were struck by how much many of them truly disliked writing. Based on this observation and a growing consensus in the related area of reading that it is better to intervene earlier than later (Slavin, Madden, & Karweit, 1989), we began a series of studies where SRSD instruction was tested first with third-grade (Graham, Harris, & Mason, 2006) and then with second-grade struggling writers (Harris, Graham, & Mason, 2006). In each case, SRSD had a strong impact on improving overall writing quality. However, the instructors reported that it was much easier to teach the second-graders versus the third-graders, because the younger students still liked to write. These studies have helped to shift our thinking on where we should place our emphasis, specifically with younger students. In addition, some of the successful students in these studies had behavioral difficulties as well as writing problems. As a consequence we are conducting a series of SRSD studies with young children at risk for both writing and behavioral difficulties with our colleague, Kathleen Lane (e.g., Lane et al., 2008).

Another example of how our research program shifted over time involved our increasing interest in regular writing

instruction. The majority of students with LD, as well as other struggling writers, receive most if not all of their writing instruction in the regular classroom. Thus, their success in writing depends greatly on their classroom teachers' preparation to teach writing, how much time these teachers devote to writing and writing instruction, and the effectiveness of the instructional procedures they apply. In addition to conducting a series of national surveys on the writing practices of regular classroom teachers (e.g., Cutler & Graham, 2008), we have also undertaken a number of reviews to identify effective writing practices for children in general and struggling writers in particular (e.g., Graham & Perrin, 2007a, 2007b; Rogers & Graham, 2008).

In this article, we provide a synthesis of our ongoing research program in writing. We start by reviewing the evidence concerning the importance of strategic behavior, knowledge, motivation, and skills in writing development. These three constructs provide the basic underpinnings of the SRSD model. We also consider a fourth construct (writing skills), which has become a basic building block in our view of writing development and writing disabilities. We employ a framework designed by Graham and Harris (2000), and later expanded by Graham (2006b), to determine if the existing evidence supports the contention that skills, strategies, knowledge, and motivation are central to writing development. In places, we draw on our own research to illustrate our basic conclusions. We further share what our investigations have uncovered about the problems students with LD and other struggling writers experience in each of these areas. Next, we more fully describe the SRSD model and examine the evidence on its effectiveness. Finally, we consider what we have learned about regular classroom writing instruction.

Because of space limitations, we do not present every study our research team has conducted. We do hit the highlights though. It is important to note that many different people have contributed to this program of research, including our colleagues (in alphabetical order): Virginia Berninger, Kathleen Lane, Charles MacArthur, Lamoine Miller, Dolores Perrin, Michael Pressley, Shirley Schwartz, and Bernice Wong. Our former students at both the University of Maryland and Vanderbilt University, as well as a few students from other universities, have also made important intellectual contributions to our ongoing research. We will not try to name all of them here to avoid inadvertently leaving someone off the list. Many of these students have subsequently developed their own programs of writing research. We are also indebted to other researchers who have extended our work, especially those who have tested SRSD.

In many ways, an ongoing research program is much like a painting in progress. Some parts of the painting have taken a definite and identifiable shape, whereas other parts are less certain and may involve only rudimentary shapes or just a few strokes of the paintbrush. Still other parts of the canvas are blank, because the whole painting has not been fully conceptualized or the painter's ideas for a specific part of the canvas are still just a mental sketch. Thus it is with our program of writing research. Much has been done, but some areas of investigation are more fully realized than others. There are many ideas that we still plan to pursue, and we hope some of our best ideas are still waiting to be discovered.

We continue to use the *Star Trek* analogy as we describe our program of research.

THE BASIC BUILDING BLOCKS OF WRITING DEVELOPMENT (AND THE PROBLEMS FACED BY STUDENTS WITH LD)

When Nick Meyer, Harve Bennett, and Bob Sallin reviewed the five previous scripts for *Star Trek II—The Wrath of Khan* (before Nick wrote his own script), they identified a number of additional building blocks on which to base the movie (Shatner & Kreski, 1994). These included: Captain Kirk meeting his grown son for the first time, the creation of the Genesis planet (Khan would later use this process as a weapon to gain revenge), and the death of Spock (Captain Kirk's second in command and an extremely popular *Star Trek* character). Like Nick, Harve, and Bob, we also added new thematic elements to our research program. One of these additions evolved largely out of our daughter's struggles with learning to write. She had so much difficulty with handwriting and spelling that she avoided writing whenever possible, and developed a negative attitude about writing that persists into adulthood. This occurred despite the fact that she eventually became a very good writer. Her experiences and the research we conducted in this area led us to revise our conceptualization of the basic building blocks in writing development to include strategic behavior, knowledge, motivation, and skills (Graham, 2006b).

Starting with an article published at the beginning of this century (Graham & Harris, 2000) and continuing more fully with a recent chapter (Graham, 2006b), we systematically examined the role of strategies, skills, knowledge, and motivation in writing development. We reasoned that if a factor, such as strategies, played an important role in writing development, then the answers to the following questions should be yes: (1) Are skilled writers more strategic than less skilled writers? (2) Do developing writers become increasingly strategic with age and schooling? (3) Do individual differences in strategic behavior predict writing performance? and (4) Does teaching developing writers to be more strategic improve their writing performance? We asked similar questions for skills, knowledge, and motivation, with the addition of an extra question for skills: Does the elimination of handwriting and spelling via dictation enhance writing performance? We examine our answers to these questions below.

Strategic Behavior

Two strategic writing behaviors, planning and revising, have been studied enough so that the four questions proposed by Graham and Harris (2000) can be reasonably answered. Available evidence supports the proposition that both planning and revising are important ingredients in writing development (see Graham, 2006b). First, skilled writers are more planful and better at revising than less skilled writers, although they concentrate more of their effort on planning than revising. Second, planning and revising become

increasingly sophisticated with age. However, there is considerable individual variation in these behaviors, especially revising. Third, planning and revising behavior generally predict writing performance. It must be noted though that the correlations between planning and writing performance vary greatly from one study to the next, and revising behavior is generally not related to performance until high school. Finally, teaching developing writers how to plan or revise has a strong and positive impact on their writing.

Despite the importance of planning and revising, our research suggests that students with LD and other struggling writers minimize the use of such strategic behaviors when writing. For example, even when we prompt these students to plan in advance of writing, they typically spend less than one minute engaged in this activity (e.g., MacArthur & Graham, 1987). Observations of their writing and analyses of their written products further suggest that they treat writing primarily as a content generation task. They compose by creating or drawing from memory a relevant idea, writing it down, and using each preceding phrase or sentence to stimulate the next idea. To illustrate, Graham (1990) observed that students with LD converted a persuasive essay assignment into a question and answer task, quickly telling whatever came to mind, and abruptly ending their response. With such an approach, little if any effort is directed at the needs of the reader, the organization of text, establishment of rhetorical goals, or evaluating and reworking written ideas. In fact, when we asked students with LD to revise their papers to make them better, they mostly focused their efforts on making a few word substitutions here and there, correcting spelling and grammar errors, and making the paper neater (e.g., MacArthur, Graham, & Schwartz, 1991).

One reason why students with LD and other struggling writers are not more strategic is that they experience difficulty regulating the mental operations involved in complex processes such as planning and revising. We demonstrated this in several studies that focused on revising (De La Paz, Swanson, & Graham, 1998; Graham, 1997). We found that students with LD increased the number and quality of substantive revisions they made when they received procedural support designed to ensure that the separate elements of the revising process were coordinated and occurred in a regular ways. This happened when they were directed to revise sentence-by-sentence (Graham, 1997) as well as when they were directed to address whole text and sentence level concerns (De La Paz et al., 1998). While our research on the strategic writing behavior of students with LD took place after the development of the SRSD model, it supports our decision to make strategies and self-regulation a central building block in the model, as does the developmental research reviewed here on the role of strategies in writing development.

Writing Skills

The accumulated evidence also supports the proposition that handwriting and spelling play an important role in writing development (Graham, 2006b). First, handwriting and spelling are easier or less cognitively demanding for more skilled

than less skilled writers. Second, there is a large body of research demonstrating that handwriting and spelling improve with age. For example, we found that children's handwriting fluency improves 10 letters or more per minute each year up to high school (Graham, Berninger, Weintraub, & Schafer, 1998). Third, individual differences in handwriting and spelling predict how well students write. In a study with 600 children, we found these two skills accounted for 25% and 42% of the variance in writing quality at the primary and intermediate grades, and 66% and 41% of the variance in writing output at these same grade levels, respectively (Graham, Berninger, Abbott, Abbott, & Whitaker, 1997). Fourth, eliminating these skills through dictation has a positive impact on the writing of specific groups of writers. For instance, MacArthur and Graham (1987) reported that students with LD produced qualitatively better text when dictating stories versus writing them by hand. Finally, there is a small body of studies showing that handwriting or spelling instruction can enhance writing performance. We found that providing extra instruction in these skills to young struggling writers increased how much they wrote and resulted in improved sentence construction skills (Graham, Harris, & Fink, 2000; Graham, Harris, & Fink-Chorzempa, 2002).

Graham (2006b) also offered a tentative proposition that sentence construction skills shape writing development. There is some evidence that skilled writers produce more complex sentences than less skilled writers, although these findings do not hold for all comparisons (e.g., good versus poor readers). Developing writers' sentences become increasingly complex with age, although this finding varies by writing task. Sentence skills are correlated with writing performance (at least in some studies), but this appears to vary by genre. Lastly, efforts to improve sentence construction skills of developing writers can enhance their writing performance, if the right type of instruction is provided. For example, Saddler and Graham (2005) reported that sentence combining instruction had a positive impact on the quality of text produced by struggling writers.

Our research has demonstrated that students with LD and other struggling writers experience difficulty mastering basic writing skills. They routinely misspell words and ignore or misplace capitalization and punctuation (MacArthur & Graham, 1987). Many produce letters slowly, trudging along at almost half the rate of their more fluent peers (Weintraub & Graham, 1998). These problems not only make their papers more difficult to read, but undermine the writing process in at least three ways (Graham, 1990). One, having to switch attention to mechanical concerns while writing (e.g., how to spell a word), may cause them to lose ideas or plans held in working memory. Two, possible writing content may be lost because children's writing (or typing) is not fast enough to keep up with their thoughts, and ideas are lost before they can be transcribed onto paper. Three, opportunities for thinking about writing ideas and making written output more precisely fit intentions are reduced when children's attention is occupied with mechanical concerns. Difficulties crafting sentence are likely to have similar effects.

The teaching of handwriting, spelling, and other basic writing skills such as sentence construction are not part of the SRSD model. However, as our analysis indicates, students'

difficulties with such skills could conceivably limit the effectiveness of such instruction. This would be most obvious for students whose mechanical problems are so severe that they can barely produce one or two sentences. As a result, we do not recommend SRSD instruction for these students. It is also possible that less severe difficulties with basic writing skills constrain the effectiveness of SRSD instruction. This possibility needs to be explored in future research.

Knowledge

There are many different types of writing knowledge, including knowledge about the writing topic, the intended audience, and how to write (e.g., discourse and linguistic knowledge). Although writing knowledge has been understudied, Graham (2006b) was able to draw a tentative conclusion that knowledge about how to write is an important ingredient in writing development. The conclusion was tentative because relatively few studies addressed each of the four questions.

First, skilled writers are more knowledgeable about how to write than less skilled writers. For example, Graham, Schwartz, and MacArthur (1993) found that good writers have a more sophisticated conceptualization of writing than students with LD. A similar finding was reported by Saddler and Graham (2007). Second, developing writers become increasingly knowledgeable about how to write over time. For instance, Graham et al. (1993) reported older writers have a more sophisticated conceptualization of writing than younger writers. Third, knowledge about how to write predicts developing writers' performance. To illustrate, Olinghouse and Graham (in press) found that discourse knowledge accounted for a significant amount of variance in fourth-grade students' story quality, output, and vocabulary diversity after four writing (i.e., handwriting fluency, spelling, attitude toward writing, advanced planning) and three nonwriting variables (i.e., grade, gender, basic reading skills) were first controlled. Fourth, there are a small number of studies that demonstrate instruction aimed at increasing writers' discourse knowledge improves writing performance.

In our research with students with LD and other struggling writers, we found that these students' conceptions about how to write placed undue emphasis on form and mechanics (Graham et al., 1993; Saddler & Graham, 2007). When asked to describe how good writers write, for example, they typically responded by saying: "Write neatly," "Put their name and date on the paper," and "Spell each word right." In contrast, their peers who are average or even strong writers placed greater emphasis on process, indicating they "Brainstorm ideas," "Organize their thoughts," and "Use interesting words." This overemphasis on form may help to explain why weaker writers are so concerned with correcting mechanical errors when they revise.

We further found that these students' discourse knowledge about writing, its genres, devices, and conventions, was quite limited. Even with a relatively familiar genre like story writing, weaker writers often were unable to identify basic attributes or parts (Graham, Harris, & Mason, 2005; Harris et al., in press). When we asked a child with LD to tell his friend what kinds of things were included in a story, he started

off on the right track ("I would tell him main character.") but quickly veered into questionable territory ("Also, a subject, predicate, and main idea."). This incomplete knowledge was further noticeable in struggling writers' stories, where they often omitted basic elements such as the location, problem, ending, or moral (Graham & Harris, 1989).

The findings reviewed here provided support for two of the decisions that we made when developing SRSD. One, the emphasis in SRSD on explicitly teaching process, including strategies for planning and revising, provided a counter to struggling writers' undue emphasis on form. Two, SRSD addressed struggling writers' limited discourse knowledge, as the planning strategies that are typically taught are genre specific and students are taught the genre knowledge needed to apply these strategies effectively.

Motivation

In his review, Graham (2006b) indicated that current research generally supports the contention that motivation is an important ingredient in writing development, but this assertion was extremely tenuous; because the evidence was very thin, it had to be combined across different motivational constructs (e.g., attitude toward writing, self-efficacy, and so forth), and one of the proposed questions could not be answered in the affirmative.

Very limited and somewhat mixed evidence favored the assertion that skilled writers are more motivated than less skilled ones. The mixed findings mainly involved the measurement of different motivational constructs. For example, Graham et al. (1993) found that average writers were more positive about their desire to write than students with LD, but there was no difference between the two groups in self-efficacy for writing. In contrast, little consistent support was found for the assertion that developing writers become more motivated over time. There was a decline in motivation on at least one variable, self-efficacy, and findings across other motivational constructs were mixed. In contrast, the available evidence mostly supported the assertion that students' motivation predicts their writing performance. For instance, Graham, Berninger, and Fan (2007) tested three different models of the relationship between attitudes and writing performance using structural equation modeling. The model that best fit the observed data postulated that children's desire to write influenced their writing performance. Last, the available data generally supported the assertion that instruction to enhance motivation has a positive impact on writing performance. This evidence was limited, though, to studies where children were provided with feedback on their learning progress. This feedback was designed to enhance self-efficacy.

Unfortunately, we have conducted less research on the motivation of struggling writers than we have on their strategic behavior, basic writing skills, and writing knowledge. We can draw three conclusions from the research we have conducted though. One, without intervention, these students demonstrate limited persistence when writing. For example, 10- to 12-year-olds with LD spent only 6 minutes when writing an essay expressing their opinion, and only 1 minute

when dictating such an essay (Graham, 1990). Two, many of these students are more confident about their writing capabilities than is warranted. For instance, 10- to 14-year-old students with LD felt they wrote just as well as their normally achieving peers (Graham et al., 1993). There is a downside to such over confidence, as children who overestimate their capabilities may fail to allocate the needed resources and effort, believing it is unnecessary, or be more likely to quit when difficulty is encountered (Sawyer, Graham, & Harris, 1992). Three, as noted above, these students are typically more negative about writing than their classmates. These three observations support our decision to make developing motivation an SRSD building block (even though the literature on the role of motivation in writing development is less clear cut).

SELF-REGULATED STRATEGY DEVELOPMENT: ITS EFFECTIVENESS

After the initial script for *Star Trek II—The Wrath of Khan* was completed, Nick Meyer faced a serious problem. Many of the key actors voiced serious concerns about the proposed movie. These concerns ranged from how their characters were treated (Leonard Nimoy thought his character Spock was just standing around waiting to die) to lingering issues about the poor quality of the first film (William Shatner felt that he had been “badly burned” by the first movie; Shatner & Kreski, 1994, p. 118). Meyer had to convince these skeptical actors that his script and the basic ideas for the new movie were sound. He did this through persuasion and by rewriting some of the story.

Like Nick Meyer, we also face a constituency that must be convinced. This includes ourselves, our fellow researchers, and the educational community. This was especially important with SRSD, as it is a complex intervention that relies heavily on explicit instruction. There are critics who view such instruction negatively, preferring to rely on more informal and incidental learning techniques (Harris & Graham, 1996; Harris et al., in press). Before sharing the evidence on the effectiveness of SRSD, we first provide a more complete description of the model.

Characteristics and Stages of SRSD Instruction

With SRSD, students are explicitly taught specific writing strategies (usually strategies for planning, revising, or both), the knowledge needed to use these strategies, and procedures for regulating these strategies, the writing process, and their behavior. Instruction is designed to promote students’ ownership and independent use of writing and self-regulation strategies. Students are treated as active collaborators in the learning process and the role of effort in learning is emphasized. The level and type of feedback and instructional support provided are adjusted to be responsive to students’ needs, gradually shifting responsibility for strategy use from teacher to student. Instruction is criterion—rather than time-based, as students move through each instructional stage at their own pace, not proceeding to later stages until they have met initial criteria.

Six stages of instruction are used to teach the writing and self-regulation strategies targeted for instruction (Graham & Harris, 2005; Harris, Graham, Mason, & Friedlander, 2008). These stages provide a general format, not a unilateral scripted approach. They can be reordered, combined, revisited, modified or deleted based on students’ needs.

Stage 1: Develop and Activate Background Knowledge

During this stage, background knowledge and preskills students need to successfully understand, learn, and apply the writing and self-regulation strategies are developed. Model compositions are read and discussed, and vocabulary carefully developed. Students may further be asked to consider whether their performance is hindered by negative self-statements, with the teacher showing them how to use more positive ones.

Stage 2: Discuss It

Teacher and students discuss the strategy to be learned and establish its goals and benefits. Each step of the strategy is explained, as are mnemonics used to help students remember it. Teachers and students explore how and when to apply the strategy, supporting generalization by going beyond the current classroom or task. The importance of effort is emphasized to enhance motivation and facilitate the development of positive, adaptive attributions. Students are asked to make a commitment to learn the strategy and act as collaborative learning partners.

Teachers may further ask students to examine and graph their current writing performance. This is done in a positive, collaborative manor with emphasis on changes that will be realized by learning the strategy. Goal-setting may be introduced too, with students setting relevant goals that can be obtained by using the strategy.

Stage 3: Model It

The teacher models how to use the strategy, selected types of self-instructions, and other self-regulation strategies while writing a paper. The self-instructions that are modeled reflect students’ needs and match their verbal style and language. These include problem definition (What is it I have to do here?), focusing attention and planning (I have to concentrate, first I need to . . . then . . .), strategy step statements (I need to write down my strategy reminder), self-evaluation and error correcting (Have I used all my parts—oops, I missed one, better add it), coping and self-control (I can handle this, go slow and take my time), and self-reinforcement (I like this ending!). As part of modeling, the teacher sets goals for what he/she plans to achieve, and subsequently assesses if goals were met.

After the strategy is modeled, the benefits and challenges of using it are discussed, along with suggestions about how it might be modified to make it more effective or efficient.

Students develop and record their preferred, personalized self-instructions. Some students may need to have a strategy modeled multiple times.

Stage 4: Memorize It

From the beginning of instruction, students participate in fun and engaging activities to help them memorize the strategy steps, corresponding mnemonics, and personalized self-statements. At this point, extra time is spent making sure that these are memorized for those students who need it. As one student explained, “You can’t use it if you can’t remember it!”

Stage 5: Support It

Teachers at this stage responsively support students’ use of the writing strategy, self-instructions, and other self-regulation procedures as they apply them to writing. This stage is characterized by collaborative writing experiences, with support and prompts gradually faded. Teachers scaffold the students’ strategy use, encouraging students to work independently, providing prompts and guidance as needed to ensure students achieve their goals.

Stage 6: Independent Performance

This stage is reached when students can use the strategy independently and correctly. If students have not already transitioned to using covert (“in your head”) self-instructions, this is encouraged.

Procedures for promoting maintenance and generalization are integrated throughout the SRSD model. These include, but are not limited to: (a) identifying opportunities to use the writing and/or self-regulation strategies in other situations, (b) analyzing how these procedures might need to be modified in these situations, (c) assigning homework to use the strategies in one or more of identified situations, (d) evaluating the success of such endeavors, and (e) reminders to use the strategies.

SRSD Effectiveness

SRSD has been applied and tested with a variety of different types of children including regularly achieving students, students at risk for writing difficulties, as well as students with LD, behavior disorders, ADHD, and Asperger’s Syndrome. In a recent meta-analysis of 15 experimental and quasi-experimental studies, Harris et al. (in press) reported an average effect size of 1.20 for writing quality immediately following instruction (an effect size of .80 is considered large), 1.23 for maintenance (based on nine studies); and 1.20 for generalization to untaught writing genres (based on five studies). The findings for a meta-analysis of 27 single subject design SRSD writing studies yielded a similar pattern (Rogers & Graham, 2008). For example, percentage

of nonoverlapping data (a single subject design effect size) for schematic structure for 21 studies was 97% following instruction (90% or > is considered evidence of a strong effect), 90% at maintenance (based on 18 studies), and 85% for generalization to uninstructed genres (based on four studies). In a different meta-analysis conducted by Graham (2006a), average effect size for writing quality for SRSD in 10 experimental and quasi-experimental studies with students with LD was 1.34. In an analysis of writing instructional studies with students in Grades 4 to 12 (Graham & Perrin, 2007a), SRSD produced the largest average effect size of any treatment that had been investigated in four or more experimental or quasi-experimental studies. Finally, we are unaware of any study (published or unpublished) where SRSD did not result in improved writing.

While many of the efficacy studies in the meta-analyses above were conducted by us, many were not. For instance, 7 of the 15 studies in Harris et al. (in press) were conducted by experimenters other than us. In addition to examining the effectiveness of the full SRSD model, we have also conducted several studies examining the value of specific aspects of the model, including self-regulation procedures (Graham & Harris, 1989; Sawyer et al., 1992) and the generalization procedures described in the previous section (Graham et al., 2005; Harris et al., in press). The basic conclusion that can be drawn from these studies is that SRSD is more effective when the full model is applied. It should also be noted that the use of specific self-regulation procedures (i.e., goal setting and self-assessment) are effective in improving the writing performance of students with LD when applied alone (Graham, MacArthur, & Schwartz, 1995; Harris, Graham, Reid, McElroy, & Hamby, 1994; Page-Voth & Graham, 1999). Finally, SRSD appears to be very effective with young students at risk for writing difficulties (Grades 2 and 3), as the average effect size for writing quality was 1.81 (based on three studies in Graham, 2006a).

WRITING INSTRUCTION IN THE REGULAR CLASSROOM

All of Harve Bennett, Bob Sallin, and Nick Meyer’s hard work and creative efforts came to a screeching halt, at least temporarily, when news of Spock’s planned death in the second *Star Trek* movie became public. Despite extremely tight security, *Trek* fans learned of the impending demise and were enraged over the proposed murder of their beloved character. Despite much hand wringing by the movie studio, this development had an up side. It was decided that the movie would revolve around Spock’s death, with his demise the climax. Bennett came to see the leak as a blessing; otherwise “we would have simply written ourselves into a corner” (Shatner & Kreski, 1994).

This crisis illustrates that context cannot be ignored. This is equally true with writing development and instruction. As we started investigating the application of SRSD as well as basic writing skills instruction (e.g., Graham et al., 2000; Graham, Harris, & Fink-Chorzempa, 2002) with young at risk students in the early 2000s we became increasingly interested in how writing was being taught to primary grade

children. We reasoned that such information would help us develop better interventions; ones that could be successfully integrated into teachers' current writing programs.

The approach we used to determine how writing was taught involved a series of surveys with randomly selected primary grade teachers from across the United States. We believed the teachers that completed the survey were representative, as the response rate for each study was 60% to 70%, and responders and nonresponders did not differ on a number of important variables, including expenditures per pupil, size of school, geographic location, and so forth. Nevertheless, the data was self-reported, raising the possibility that teachers provided a more flattering picture of instruction than actually existed.

Across surveys there were a number of positive findings. One, primary grade teachers indicated that 1 hour a day was devoted to writing and writing instruction (Cutler & Graham, 2008; Graham, Harris, MacArthur, & Fink-Chorzempa, 2003). We were worried that less time would be allocated. Two, the majority of teachers made multiple adaptations for struggling writers (Graham Harris, MacArthur, & Fink-Chorzempa, 2003; Graham, Morphy, et al., 2008). Three, teachers placed considerable emphasis on teaching basic writing skills, devoting up to 50% of writing time to such instruction (Cutler & Graham, 2008; Graham et al., 2003). As noted earlier, these skills play an important role in writing development (Graham, 2006b). For handwriting and spelling, the amount of time spent teaching each was consistent with research-based recommendations (Graham, Harris et al., 2008; Graham, Morphy, et al., 2008). Four, young students received considerable exposure to narrative text (Cutler & Graham, 2008).

Unfortunately, there were more areas for concern than there were for celebration. First, there was considerable variability in teachers' responses across the surveys. Thus, there were some teachers who devoted little time to writing or writing instruction (Cutler & Graham, 2008), and almost 40% of teachers made few or no adaptations for struggling writers (Graham et al., 2003; Graham, Morphy et al., 2008). Second, students spent only about 20 to 30 minutes a day actually writing (Cutler & Graham, 2008; Graham et al., 2003; Graham, Harris et al., 2008), with very little emphasis on writing expository text (Cutler & Graham, 2008). Third, teachers placed considerable emphasis on teaching grammar, even though such instruction is ineffective (Graham & Perrin, 2007a). Fourth, there was also reason to be concerned about how some teachers taught handwriting and spelling. For instance, some teachers would have one long handwriting practice session each week (Graham, Harris, et al., 2008), even though motor skills are best learned through frequently spaced practices (Graham & Miller, 1980). Fifth, teachers indicated that their students rarely used computers and word processing for writing at school (Cutler & Graham, 2008). Sixth, there was little connection between school and home in terms of writing, as teachers infrequently communicated with parents about their child's writing progress, assigned writing homework, or asked parents to listen to something written by the child at school. Seventh, almost 30% of teachers indicated their college teacher preparation program did an inadequate job of preparing them to teach writing.

In our most recent national survey with primary grade teachers (Cutler & Graham, 2008), 20% of teachers indicated that they applied a process approach to writing instruction and another 72% indicated they used a process approach plus skills instruction. One characteristic of the process approach is an emphasis on students engaging in cycles of planning, translating, and revising as they write. However, concern has been raised (see Graham & Harris, 1997) that students in process writing programs are not taught strategies for carrying out the processes involved in planning, revising, and so forth (as is done SRSD). Our survey studies showed this is a valid concern, as teachers devoted relatively little time to such instruction (Cutler & Graham, 2008; Graham et al., 2003). There is evidence, however, that integrating strategy instruction into a process approach has a positive impact on students with LD and other struggling writers (e.g., Danoff, Harris, & Graham, 1993; MacArthur, Schwartz, & Graham, 1991).

As part of our efforts to identify effective instructional practices, Steve, along with other colleagues, conducted three comprehensive reviews of the literature. All of these focused on students in Grades 4 to 12, with one concentrating on experimental and quasi-experimental studies (Graham & Perrin, 2007a), another on single-subject design studies (Rogers & Graham, 2008) and a third on qualitative studies involving exceptional literacy teachers (Graham & Perrin, 2007c). While we do not summarize these reviews here (but hope interested readers will consult them), they played a central role in a national survey of the writing instructional practices of high school teachers (Kiuahara, Graham, & Hawken, in press). In this study, we surveyed language arts, science, and social studies teachers in Grades 9 to 12. On the positive side, two-thirds of the teachers indicated they used almost all of the identified research-supported practices at least sometime during the year. Similarly, the teachers made a variety of adaptations for struggling writers, but they were also applied infrequently.

Of particular concern was the finding that many teachers, including a sizable proportion of the language arts teachers, felt that they were not adequately prepared to teach writing. Just as importantly, teachers rarely asked their students to complete writing assignments that involved multiple paragraphs. In fact, three of the six most common writing activities required minimal written responses: short answer responses for homework, completing work sheets, and making lists. In general, language arts teachers did more to teach writing than social studies teachers who did more than science teachers. None of these groups of teachers, however, did a lot to teach writing.

The survey studies reviewed here reveal that much needs to be done if students with LD and other struggling writers' are to realize their writing potential. While we did not survey special education teachers about how they teach writing, we suspect based on our experience, they devote even less attention to this skill than regular teachers. Clearly, the lack of adequate preparation for many teachers must be addressed. We also think it is important to identify other teacher characteristics that influence writing instruction. For example, primary grade teachers' efficacy for teaching writing (Graham, Harris, Fink, & MacArthur, 2001) and their beliefs about

writing instruction (Graham, Harris, Fink, & MacArthur, 2002) predict how they teach students' to write.

FUTURE DIRECTIONS

The story line for *Star Trek II: The Wrath of Khan* continued to develop as the film was shot, tested with an audience, and reviewed by the studios (Shatner & Kreski, 1994). Before filming began, it was decided that Spock would be killed in the first 3 minutes of the film, but the audience would be led to believe that he would not really die, as the death occurred during a hypothetical simulation exercise involving Starfleet cadets. Later when the audience became immersed in the story, they would sneak his actual death back into the action as a genuine surprise. Spock's death shifted again after an initial audience screening and a discussion with studio executives, and it was decided that the movie would end with the possibility of a future resurrection. This occurred in the next movie, *Star Trek III: The Search for Spock*.

While some additional tinkering took place, the *Wrath of Khan* was eventually completed, and was judged to be a commercial and artistic success. After the debacle of the first movie, this was necessary if the series was to "Live long and prosper" (to coin Spock's most famous saying). The mental processes involved in its creation are now frozen in time in film as well as books about its creation. Fortunately for us, we are still engaged in the creative processes of conducting a long-standing research program.

We would like to close this article by sharing some of these mental sketches, as we are hopeful that we can complete these parts of the canvas. Undoubtedly, we will continue to conduct research on the effectiveness of SRSD. This will include assessing the effectiveness of the model with new populations of students as well as the testing and development of new strategies, including strategies designed to enhance both writing and reading performance. We will also test new variations of the SRSD model in an effort to make it even more effective. We are especially interested in examining what happens when young at risk students receive SRSD instruction for multiple years as well as how SRSD and other forms of writing instruction can be effectively integrated together. This includes determining the value added impact of SRSD when it is incorporated into existing programs, such as the process approach to writing. Current examples of this type of research include Danoff et al. (1993) and MacArthur et al. (1991). It also involves testing what combinations of treatments are effective with specific types of struggling writers. It is possible that some students only need extra strategy instruction, whereas others need extra instruction in strategies and sentence construction, and still others need extra strategy, sentence, handwriting, and spelling instruction. Finally, we have recently begun, and will continue, research on scaling up SRSD as classroom teachers implement SRSD either class wide or with individual students.

We further plan to continue our research on factors that contribute to writing development and writing disabilities. The greatest need at this point involves a better understanding of how knowledge about writing and motivation to write shape writing development. This is not to say, however, that

we have learned all we need to know about writing strategies and skills. In fact, from a cognitive/motivational perspective, the few existing theoretical models of children's writing development are incomplete and rudimentary (see Graham, 2006b). New basic research on writing development is needed if we are to make new advances in this area. Without such advances, our understanding of writing disabilities is likely to be limited.

Another area where we will continue to conduct research involves classroom practices and teacher characteristics. We are currently in the process of designing two national survey studies to determine how intermediate grade and middle school teachers teach writing, their beliefs about writing instruction, and their preparation to teach this skill. We also plan to examine how teacher characteristics such as teacher efficacy, their writing practices, and student achievement are linked together.

Although some scholars may not view advocacy as an integral part of an ongoing research program, we have increasingly become drawn into the policy vortex. The lifeline of new and ongoing research is funding. At present, little writing research is funded by the federal government. To illustrate, the Institute for Educational Sciences holds grant competitions for reading and writing research, but funds very few writing proposals. This can be verified by visiting their web site. Without such funding, it is difficult to maintain ongoing programs of research and for new researchers to start their own programs.

Perhaps just as importantly, writing is not a central player in efforts to reform and improve the nation's schools. This was highlighted in the 2003 report from the National Commission on Writing, but the idea that improved writing instruction is central to school and later success has not gained much traction. There are several reasons why this may be the case. One, policy makers may believe that educators do not possess the tools to teach writing effectively. This is what we term the "Writing Can't Be Taught" proposition captured in this famous quote from Somerset Maugham: "There are three rules for writing the novel. Unfortunately no one knows what they are" (Winokur, 1999, p. 146). At the request of the Carnegie Corporation, Steve along with Dolores Perrin (Graham & Perrin, 2007c) examined this issue by conducting a meta-analysis, titled *Writing Next*, of the writing intervention literature for Grades 4 to 12. We found that writing can in fact be taught, and identified 11 practices that reliably improve the quality of students' writing. This work will continue, as we are now involved in a meta-analysis of the effectiveness of writing interventions with elementary-grade students as well as meta-analyses with some of our current students on specific writing methods (e.g., Karin Sandmel on the process writing approach and Paul Morphy on the use of word processing with struggling writers).

A second reason why writing may not be a player in current reform efforts is because policy makers do not believe it is important. We have been active in testing this proposition. In addition to identifying effective practices for teaching writing, *Writing Next* also examined if writing influences content learning (Graham & Perrin, 2007c). The answer is yes: writing about content material enhances how well it is learned. Steve and one of his students, Michael Hebert, are continuing

the work in this area by conducting a new meta-analysis to determine if writing about material read enhances comprehension and if there are positive transfer effects from writing instruction to reading development.

As we hope this article demonstrated, a long-standing research program has a life of its own. While its development is orderly and logical, its architects cannot fully predict how it will proceed, as it is apt to pick up new baggage along the way and take unanticipated turns. Changes in the scope and direction of the program are not only influenced by new ideas from other researchers and scholars, but as a program of research becomes more influential it shapes the action and policies of others.

We would also like to indicate that we published a similar article in the early 1990s (Graham, Harris, MacArthur, & Schwartz, 1991). It might be interesting to read this and the former paper to see how much or little our research program has changed in the ensuing years.

While *The Wrath of Khan* was still showing in movie theatres, Paramount Pictures committed to shooting a third movie, *The Search for Spock*. All of the *Star Trek* crew signed on to do the movie, but Leonard Nimoy who played Spock went where “no *Star Trek* actor had gone before” (Shatner & Kreski, 1994, p. 152). He directed the film. This provided the studio with an incredible marketing hook: Spock directs *The Search for Spock*. Hopefully, we will produce a third installment in our description of our ongoing research program. It is unlikely that we will revisit *Star Trek* for that article, as we will surely want a new hook.

REFERENCES

- Alley, G., & Deshler, D. (1979). *Teaching the learning disabled adolescent: Strategies and methods*. Denver, CO: Love.
- Brown, A., Campione, J., & Day, J. (1981). Learning to learn: On training students to learn from text. *Educational Researcher*, 10, 14–21.
- Cutler, L., & Graham, S. (2008). Primary grade writing instruction: A national survey. *Journal of Educational Psychology*, 100, 907–919.
- Danoff, B., Harris, K. R., & Graham, S. (1993). Incorporating strategy instruction into the school curriculum: Effects on children's writing. *Journal of Reading Behavior*, 25, 295–322.
- De La Paz, S., Swanson, P., & Graham, S. (1998). Contribution of executive control to the revising problems of students with writing and learning difficulties. *Journal of Educational Psychology*, 90, 448–460.
- Flower, L., & Hayes, J. (1980). The dynamics of composing: Making plans and juggling constraints. In L. Gregg & R. Steinberg (Eds.), *Cognitive processes in writing* (pp. 31–50). Hillsdale, NJ: Erlbaum.
- Graham, S. (1980). Word recognition skills of learning disabled children and average students. *Reading Psychology*, 2, 23–33.
- Graham, S. (1982). Written composition research and practice: A unified approach. *Focus on Exceptional Children*, 14, 1–16.
- Graham, S. (1990). The role of production factors in learning disabled students' compositions. *Journal of Educational Psychology*, 82, 781–791.
- Graham, S. (1997). Executive control in the revising of students with learning and writing difficulties. *Journal of Educational Psychology*, 89, 223–234.
- Graham, S. (2006a). Strategy instruction and the teaching of writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 187–207). New York: Guilford.
- Graham, S. (2006b). Writing. In P. Alexander & P. Winne (Eds.), *Handbook of educational psychology* (pp. 457–478). Mahwah, NJ: Erlbaum.
- Graham, S., Berninger, V., Abbott, R., Abbott, S., & Whitaker, D. (1997). The role of mechanics in composing of elementary school students: A new methodological approach. *Journal of Educational Psychology*, 89, 170–182.
- Graham, S., Berninger, V., & Fan, W. (2007). The structural relationship between writing attitude and writing achievement in young children. *Contemporary Educational Psychology*, 32, 516–536.
- Graham, S., Berninger, V., Weintraub, N., & Schafer, W. (1998). The development of handwriting fluency and legibility in grades 1 through 9. *Journal of Educational Research*, 92, 42–52.
- Graham, S., & Harris, K. R. (1989). A components analysis of cognitive strategy instruction: Effects on learning disabled students' compositions and self-efficacy. *Journal of Educational Psychology*, 81, 353–361.
- Graham, S., & Harris, K. R. (1997). Whole language and process writing: Does one approach fit all? In J. Lloyd, E. Kameenui, & D. Chard (Eds.), *Issues in educating students with disabilities* (pp. 239–258). Hillsdale, NJ: Erlbaum.
- Graham, S., & Harris, K. R. (2000). The role of self-regulation and transcription skills in writing and writing development. *Educational Psychologist*, 35, 3–12.
- Graham, S., & Harris, K. R. (2003). Students with learning disabilities and the process of writing: A meta-analysis of SRSD studies. In L. Swanson, K. R. Harris, & S. Graham (Eds.), *Handbook of research on learning disabilities* (pp. 383–402). New York: Guilford.
- Graham, S., & Harris, K. R. (2005). *Writing better: Teaching writing processes and self-regulation to students with learning problems*. Baltimore: Brookes.
- Graham, S., Harris, K. R., & Fink, B. (2000). Is handwriting causally related to learning to write? Treatment of handwriting problems in beginning writers. *Journal of Educational Psychology*, 92, 620–633.
- Graham, S., Harris, K. R., Fink, B., & MacArthur, C. (2001). Teacher efficacy in writing: A construct validation with primary grade teachers. *Scientific Study of Reading*, 5, 177–202.
- Graham, S., Harris, K. R., Fink, B., & MacArthur, C. (2002). Primary grade teachers' theoretical orientations concerning writing instruction: Construct validation and a nationwide survey. *Contemporary Educational Psychology*, 27, 147–166.
- Graham, S., Harris, K. R., & Fink-Chorzempa, B. (2002). Contributions of spelling instruction to the spelling, writing, and reading of poor spellers. *Journal of Educational Psychology*, 94, 669–686.
- Graham, S., Harris, K. R., MacArthur, C., & Fink-Chorzempa, B. (2003). Primary grade teachers' instructional adaptations for weaker writers: A national survey. *Journal of Educational Psychology*, 95, 279–293.
- Graham, S., Harris, K., MacArthur, C., & Schwartz, S. (1991). Writing and writing instruction with students with learning disabilities: A review of a program of research. *Learning Disability Quarterly*, 14, 89–114.
- Graham, S., Harris, K. R., & Mason, L. (2005). Improving the writing performance, knowledge, and motivation of struggling young writers: The effects of self-regulated strategy development. *Contemporary Educational Psychology*, 30, 207–241.
- Graham, S., Harris, K. R., Mason, L., Fink-Chorzempa, B., Moran, S., & Saddler, B. (2008). How do primary grade teachers teach handwriting: A national survey. *Reading & Writing: An Interdisciplinary Journal*, 21, 49–69.
- Graham, S., Harris, K., & Sawyer, R. (1987). Composition instruction with learning disabled students: Self-instructional strategy training. *Focus on Exceptional Children*, 20, 1–111.
- Graham, S., MacArthur, C., & Schwartz, S. (1995). The effects of goal setting and procedural facilitation on the revising behavior and writing performance of students with writing and learning problems. *Journal of Educational Psychology*, 87, 230–240.
- Graham, S., & Miller, L. (1979). Spelling research and practice: A unified approach. *Focus on Exceptional Children*, 12, 1–16.
- Graham, S., & Miller, L. (1980). Handwriting research and practice: A unified approach. *Focus on Exceptional Children*, 13, 1–16.
- Graham, S., Morphy, P., Harris, K., Fink-Chorzempa, B., Saddler, B., Moran, S., et al. (2008). Teaching spelling in the primary grades: A national survey of instructional practices and adaptations. *American Educational Research Journal*, 45, 796–825.
- Graham, S., & Perrin, D. (2007a). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology*, 99, 445–476.

- Graham, S., & Perrin, D. (2007b). What we know, what we still need to know: Teaching adolescents to write. *Scientific Studies in Reading, 11*, 313–336.
- Graham, S., & Perrin, D. (2007c). *Writing Next: Effective strategies to improve writing of adolescent middle and high school*. Washington, DC: Alliance for Excellence in Education.
- Graham, S., Schwartz, S., & MacArthur, C. (1993). Knowledge of writing and the composing process, attitude toward writing, and self-efficacy for students with and without learning disabilities. *Journal of Learning Disabilities, 26*, 237–249.
- Gregg, L., & Steinberg, R. (Eds.). (1982). *Cognitive processes in writing*. Hillsdale, NJ: Erlbaum.
- Harris, K. R. (1982). Cognitive-behavior modification: Application with exceptional students. *Focus on Exceptional Children, 15*, 1–12.
- Harris, K. R., & Brown, R. (1982). Cognitive modification and informed teacher treatments for shy children. *Journal of Experimental Education, 50*, 137–144.
- Harris, K., & Graham, S. (1985). Improving learning disabled students' composition skills: Self-control strategy training. *Learning Disability Quarterly, 8*, 27–36.
- Harris, K., & Graham, S. (1992). *Helping young writers master the craft: Strategy instruction and self-regulation in the writing process*. Cambridge, MA: Brookline Books.
- Harris, K. R., & Graham, S. (1996). Constructivism and students with special needs: Issues in the classroom. *Learning Disabilities Research & Practice, 11*, 134–137.
- Harris, K. R., Graham, S., Brindle, M., & Sandmel, K. (in press). Metacognition and children's writing. In D. Hacker, J. Dunlosky, & A. Graesser (Eds.), *Handbook of metacognition in education*. Mahwah, NJ: Erlbaum.
- Harris, K. R., Graham, S., & Mason, L. (2003). Self-regulated strategy development in the classroom: Part of a balanced approach to writing instruction for students with disabilities. *Focus on Exceptional Children, 35*, 1–16.
- Harris, K. R., Graham, S., & Mason, L. (2006). Improving the writing, knowledge, and motivation of struggling young writers: Effects of Self-Regulated Strategy development with and without peer support. *American Educational Research Journal, 43*, 295–340.
- Harris, K. R., Graham, S., Mason, L., & Friedlander, B. (2008). *Powerful writing strategies for all students*. Baltimore: Brookes.
- Harris, K. R., Graham, S., Reid, R., McElroy, K., & Hamby, R. (1994). Self-monitoring of attention versus self-monitoring of performance: A cross task comparison. *Learning Disability Quarterly, 17*, 121–139.
- Harris, K. R., Santangelo, T., & Graham, S. (2008). Self-regulated strategy development in writing: An argument for the importance of new learning environments. *Instructional Science, 36*, 395–408.
- Kiuhara, S., Graham, S., & Hawken, L. (2009). Teaching writing to high school students: A national survey. *Journal of Educational Psychology, 101*, 136–160.
- Lane, K., Harris, K. R., Graham, S., Weisenbach, J., Brindle, M., & Morphy, P. (2008). The effects of self-regulated strategy development on the writing performance of second grade students with behavioral and writing difficulties. *Journal of Special Education, 41*, 234–253.
- MacArthur, C., & Graham, S. (1987). Learning disabled students' composing under three methods of text production: Handwriting, word processing, and dictation. *Journal of Special Education, 21*, 22–42.
- MacArthur, C., Graham, S., & Schwartz, S. (1991). Knowledge of revision and revising behavior among students with learning disabilities. *Learning Disability Quarterly, 14*, 61–74.
- MacArthur, C., Schwartz, S., & Graham, S. (1991). Effect of a reciprocal peer revision strategy in special education classrooms. *Learning Disabilities Research & Practice, 6*, 201–210.
- Meichenbaum, D. (1977). *Cognitive behavior modification: An integrative approach*. New York: Plenum Press.
- National Commission on Writing. (2003, April). *The neglected R: The need for a writing revolution*. Available at: www.collegeboard.com
- Olinghouse, N., & Graham, S. (2009). The relationship between the discourse knowledge and the writing performance of elementary-grade students. *Journal of Educational Psychology, 101*, 37–50.
- Page-Voth, V., & Graham, S. (1999). Effects of goal setting and strategy use on the writing performance and self-efficacy of students with writing and learning problems. *Journal of Educational Psychology, 91*, 230–240.
- Poplin, M., Gray, R., Larsen, S., Banikowski, A., & Mehring, T. (1980). A comparison of the components of written expression abilities in learning disabled and non-disabled students at three grade levels. *Learning Disability Quarterly, 3*, 46–53.
- Rogers, L., & Graham, S. (2008). A meta-analysis of single subject design writing intervention research. *Journal of Educational Psychology, 100*, 879–906.
- Saddler, B., & Graham, S. (2005). The effects of peer-assisted sentence combining instruction on the writing performance of more and less skilled young writers. *Journal of Educational Psychology, 97*, 43–54.
- Saddler, B., & Graham, S. (2007). The relationship between writing knowledge and writing performance among more and less skilled writers. *Reading and Writing Quarterly, 23*, 231–247.
- Sawyer, R., Graham, S., & Harris, K. (1992). Direct teaching, strategy instruction, and strategy instruction with explicit self-regulation: Effects on learning disabled students' composition skills and self-efficacy. *Journal of Educational Psychology, 84*, 340–352.
- Shatner, W., & Kreski, C. (1994). *Star Trek: Movie memories*. New York: Harper Collins.
- Slavin, R., Madden, N., & Karweit, N. (1989). Effective programs for students at risk: Conclusions for practice and policy. In R. Slavin, N. Karweit, & N. Madden (Eds.), *Effective programs for students at risk* (pp. 21–54). Boston: Allyn & Bacon.
- Weintraub, N., & Graham, S. (1998). Writing legibly and quickly: A study of children's ability to adjust their handwriting to meet common classroom demands. *Learning Disabilities Research & Practice, 13*, 146–152.
- Winokur, J. (1999). *Advice to writers*. New York: Pantheon.

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